Identifying Important Factors Influencing Children's Exposures to Pesticides

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Insufficient data on children's exposures and activities make it difficult to adequately assess multimedia exposures to environmental contaminants. As a result, regulators must rely upon a series of default assumptions and exposure factors when conducting risk assessments. The Children's Exposure Research Program in the National Exposure Research Laboratory has supported numerous laboratory and field studies to reduce uncertainty in the exposure estimates with the goal of ensuring that pesticides are regulated appropriately. These studies were conducted to identify pesticide use patterns, measure pesticide concentrations in homes and day care centers, describe spatial and temporal distributions of pesticide concentrations following residential applications, evaluate approaches for estimating dermal and non-dietary exposure, and characterize activity patterns of young children. We have assembled the data from these studies and performed analyses to identify the exposure pathways and activities that strongly impact children's exposures and to evaluate other factors that are thought to influence exposures. Comparisons of results across multiple studies have revealed consistencies and trends that were not apparent from the individual studies. The results are to be published in a forthcoming EPA Report. Among the highlights, we present evidence that inhalation exposures are strongly influenced by the physicochemical properties of the compounds, seemingly unimportant modifications of surface measurement techniques sharply affect results, indirect ingestion represents a far greater concern for the pyrethroids than for the organophosphates, and urinary metabolite concentrations reflect the gross pesticide usage level of a targeted subpopulation. We expect the results of these analyses to be useful to the EPA Program Offices in moving risk assessment and risk management into the future by facilitating the replacement of default assumptions with high-quality, real-world data. Fewer default assumptions will produce more accurate exposure and risk assessments and will bolster ensuing risk-reducing actions.

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